

User's Manual for the LED-1 Single Color LED "Eyes"

Thank you for your purchase of the LED-1 Single Color LED Eyes from Animated Prop Systems. This LED controller is designed to be easy to use and this manual will describe how it works and how to connect it.

What does the LED-1 do?

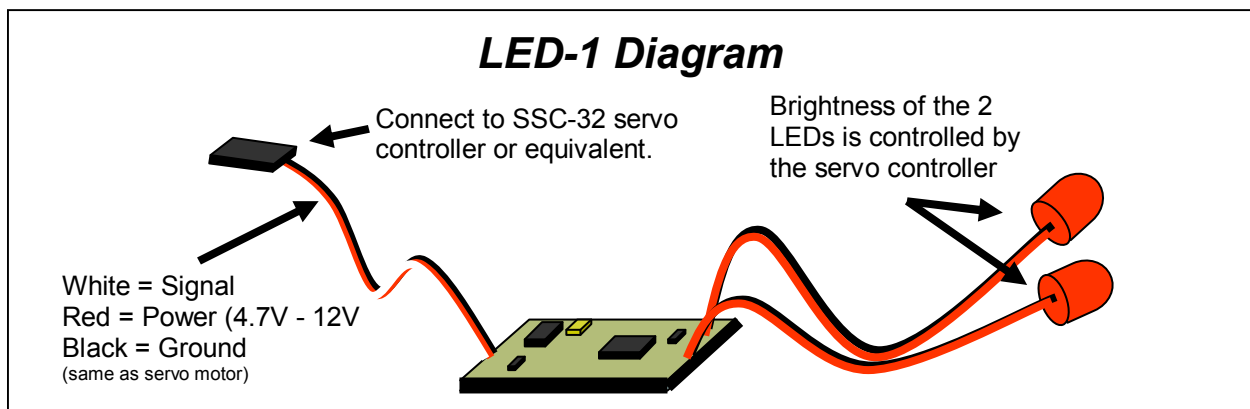
The LED-1 is a small PC board that allows you to control the brightness of two LEDs by using a RC servo motor controller. The two LEDs can be used to simulate "eyes" in theatrical type props as well as many other applications such as RC model headlights, running lights etc.

What else will I need to use the LED-1?

In order for the LED-1 to operate, it must be connected to a controller of some kind that sends the signal to the LED-1 on how bright to set the LEDs. There are essentially two ways you can do this:

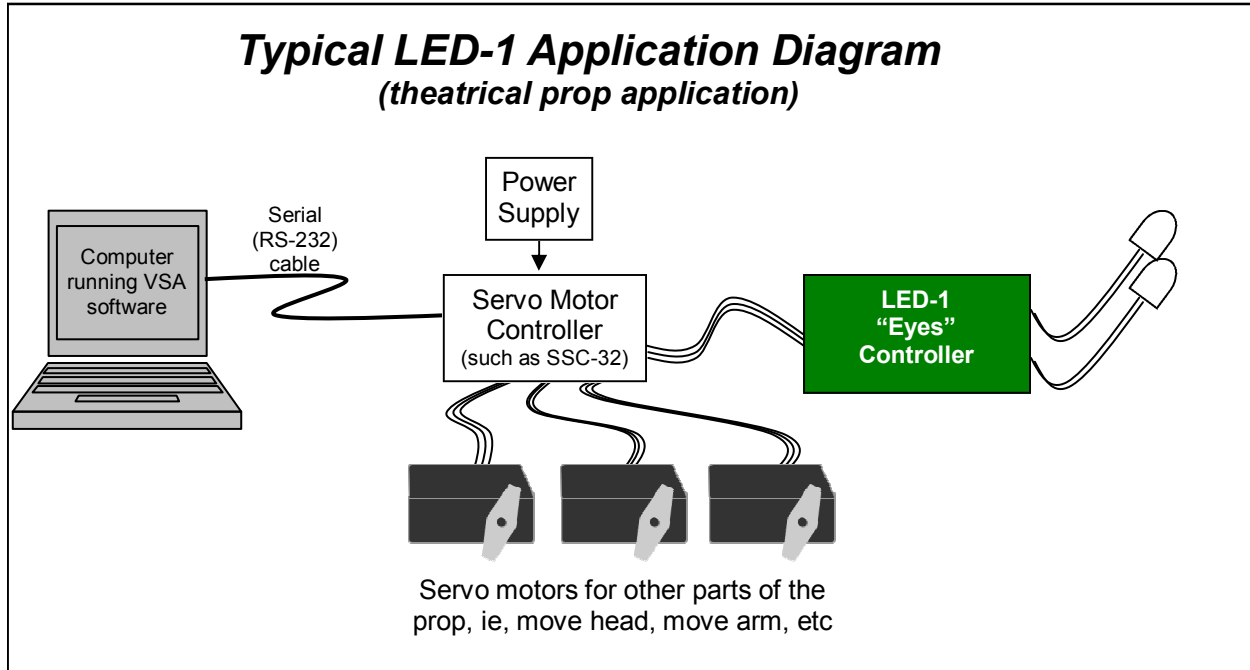
1) By far the easiest method of controlling the LED-1 is to use a RC style servo motor controller that connects to your PC and is designed to control the type of servo motors that are used in RC planes and cars. The LED-1 was specifically designed to work with this type of controller and instead of turning the shaft of a motor it will adjust the brightness of the LEDs. One choice for this type of controller is the SSC-32 by LynxMotion (www.lynxmotion.com) which costs about \$40USD and connects to your PC via a serial (RS-232) cable. It has the capability to control up to 32 devices. If you choose this method you will also need some kind of software to send commands from your PC to the servo controller board. For this element, many people choose to use a program called Visual Show Automation (or VSA) by Brookshire Software (www.brookshiresoftware.com). There is more information on using the LED-1 in this configuration in the next section

2) For more advanced users, you can also choose to control the LED-1 with a microcontroller of some kind that sends the pulse signal to the LED-1. There is more information on this method at the end of this document.



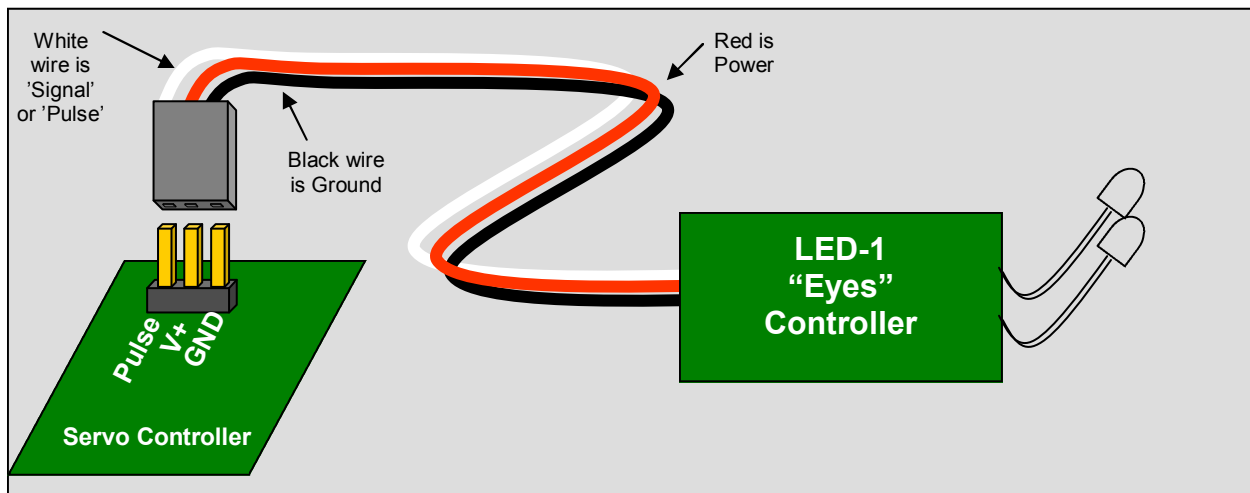
Where does the LED-1 fit into a prop system?

The diagram below shows a what a typical application might look like for a theatrical type of prop. The computer is running the VSA software and is connected to a SSC-32 servo controller via a serial cable. The SSC-32 is controlling the brightness of the LED-1 “Eyes” as well as multiple servo motors that move other parts of the prop.



How do I connect the LED-1 to my servo controller?

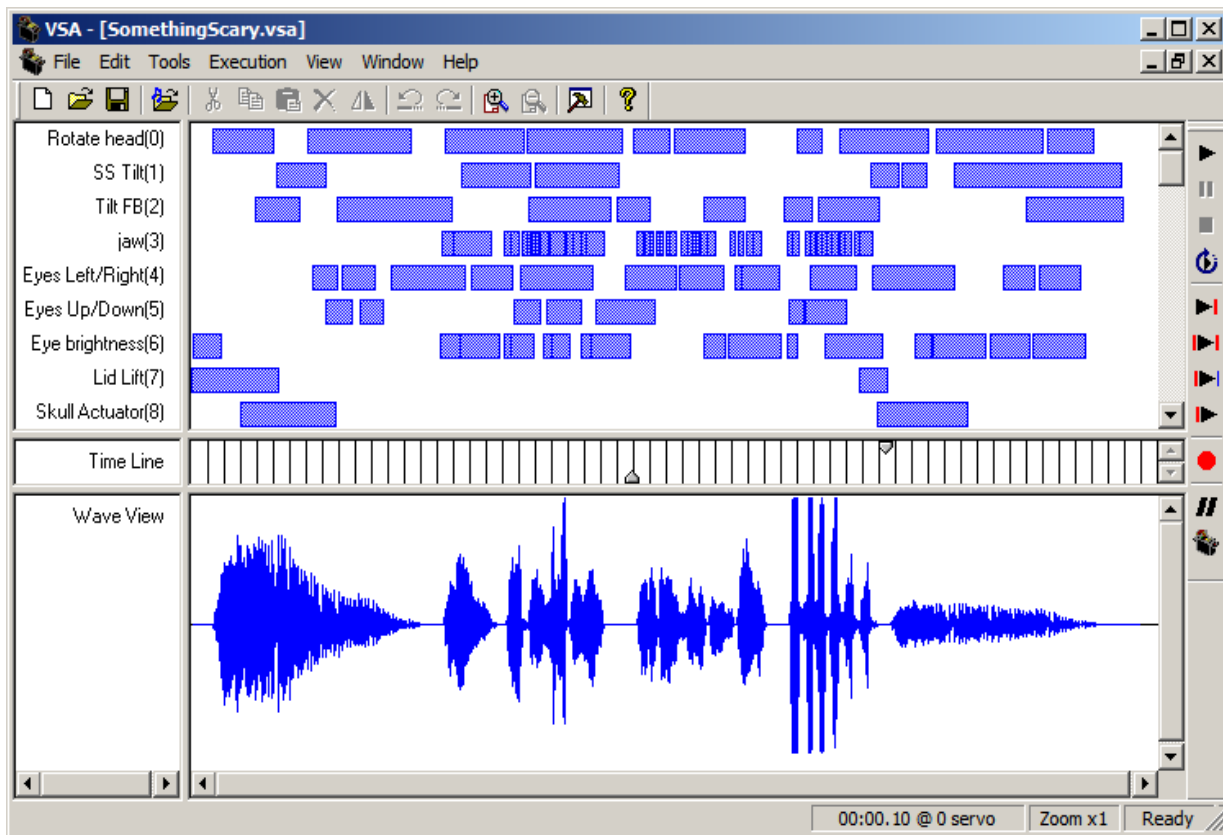
The connector on the LED-1 is connected to your servo controller using the 3 position female connector. This is the same connector used on standard RC style servo motors. Most servo controller boards follow a standard connection scheme as shown in the diagram. Make the connector from the LED-1 is oriented correctly as shown with the black wire connected to the ground (GND) connection on the servo controller board and the white wire connected to the “pulse” or “signal” pin on your controller board.



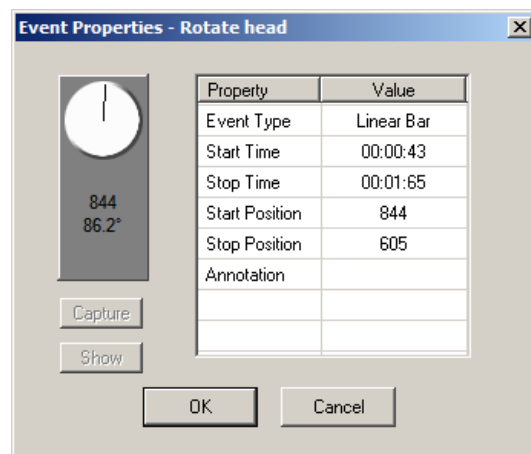
Using the LED-1 with VSA (Visual Show Automation)

As mentioned earlier in this document, the easiest method of controlling the LED-1 is by using a servo controller in conjunction with control software such as Visual Show Automation (VSA) by Brookshire Software (www.brookshiresoftware.com) which costs about \$60 USD. Programs like VSA allow the user to synchronize sound to the actions of a prop (such as moving parts of the prop or blinking lights etc.) If you have ever been to an amusement park like Disneyland and been on a ride like “Pirates of the Caribbean” then you have seen human-like figures that talk and move. Controlling such a figure can be done with a program such as VSA.

The screen shot below shows what a typical ‘routine’ might look like with the audio file in the bottom part of the window and in the top part you see the movements of the prop synchronized to the audio file.

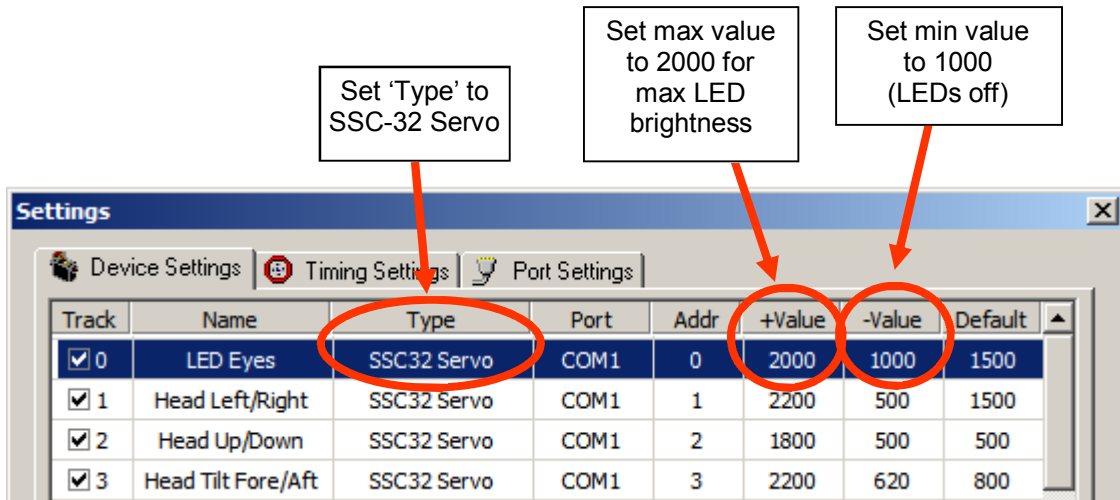


Each of the blue ‘bars’ in the screen shot above represents an action of some kind such as rotating a servo motor or adjusting the brightness of LEDs. Each of these actions is set by adjusting the ‘Properties’ as shown in the screen shot to the right. This one shows the movement of a servo motor from position 844 (start position) to position 605 (stop position). The speed of this movement is determined by the length of the bar in the upper screen shot.



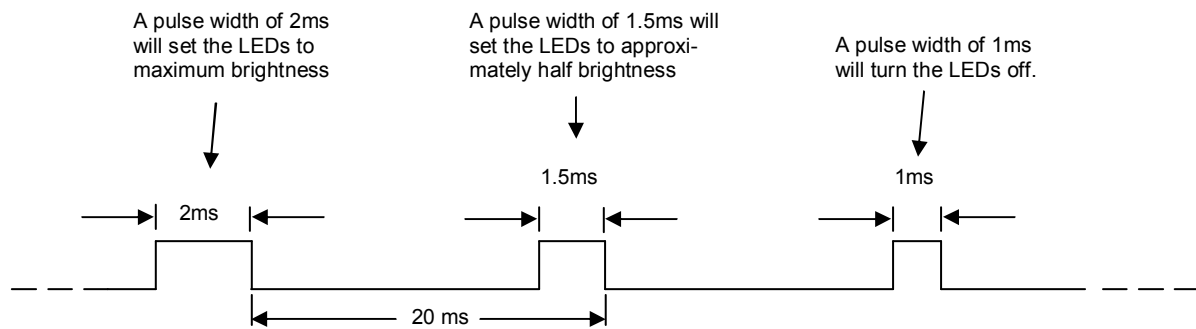
Configuring VSA for using the LED-1

When using VSA, each 'track' has to be configured to indicate what type of device is being used (i.e., servo motor, LED brightness controller, relay etc) and the min and max movements for each device. For the LED-1 you should configure the 'Type' as SSC-32 servo and set the min value as 1000 and the max value of 2000. When setting your actions, a value of 2000 will get you the maximum brightness of the LEDs and the setting the value to 1000 will turn the LEDs completely off.



Advanced topics - controlling the LED-1 with a microcontroller

In addition to controlling the LED-1 using a servo motor controller, it is also possible to control the LED-1 by a pulse signal from another device such as a microcontroller, provided that connections for power and ground are also made. The power is regulated down to 3.3V on the board and accepts an input voltage range of between 4.7V and 12V. The pulse signal itself should not be more than about 5.5V. The width of the pulse will determine the brightness of the LEDs. A pulse width of 1ms will turn the LEDs completely off and a pulse width of 2ms will set the LEDs to maximum brightness. Any pulse in between will set the brightness accordingly. Pulses less than 1ms or pulses greater than 2ms will be ignored. Only a single pulse is required to set the brightness, but to maintain compatibility with how servo motors work, you may want to send continuous pulse train with a frequency of about 50Hz. This is a standard frequency and most RC servo motors will respond to this frequency and pulse width.



While only a single pulse is required by the LED-1 to set brightness, a continuous pulse train with a period of approximately 20ms (50 Hz) will maintain compatibility with standard servo motors

Additional Resources

Sources for servo motor controllers

Lynxmotion www.lynxmotion.com
Parallax www.parallax.com
Pololu www.pololu.com

Sources for servo motors

Servo City www.servocity.com
Tower Hobbies www.towerhobbies.com

Sources for controller software

Brookshire Software www.brookshiresoftware.com